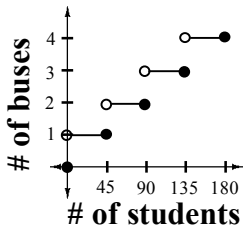
Lesson 1.1.1

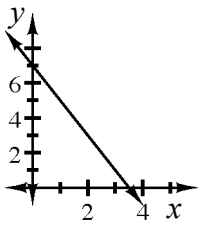
1-4. a: $\frac{1}{2}$, b: 3

1-5. a: $h(x)$ then $g(x)$; b: yes, $g(x)$ then $h(x)$

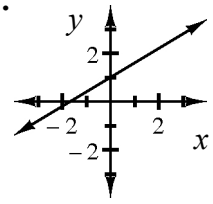
1-6.



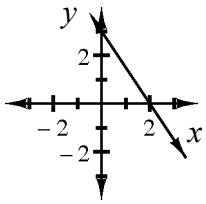
1-7. a:



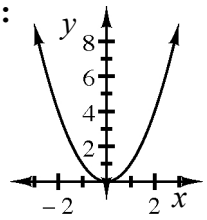
b:



c:



d:



1-8. a: not linear, b: the exponent, c: a parabola

1-9. Sample answer: $y = mx + b$ is a line, b represents the y-intercept, m represents the slope, and (x, y) is the ordered pair for every point on the line.

Lesson 1.1.2

1-13. $y = 2x + 10$

graph:

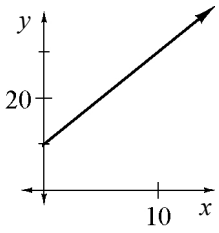


table:

x	0	1	2	3	4
y	10	12	14	16	18

1-14. a: $x = -13$ or $x = 7$, b: $x = \frac{-3}{2}$ or $x = \frac{7}{3}$, c: $x = 0$ or $x = 3$, d: $x = 0$ or $x = 5$, e: $x = 7$ or $x = -5$, f: $x = \frac{1}{3}$ or $x = -5$

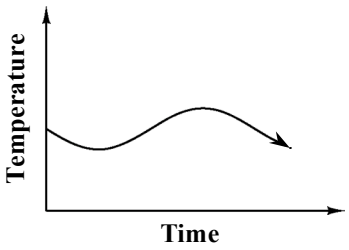
1-15. a: 14, –4, $3x - 1$; b: Multiply by 3 and then subtract 1.

1-16. a: $y = 5x - 2$, b: $x = \frac{2}{5}$

1-17. a: 21, 15, $(0, 15)$, b: –3, 3, (0, 3)

1-18. **a: 16, b: 9, c: 478.38**

1-19. **a: y depends on x; x is independent. Explanations vary.**
b: Temperature is dependent; time is independent.
c: sample graph:



1-20. $y = 30 - x$ **graph:**

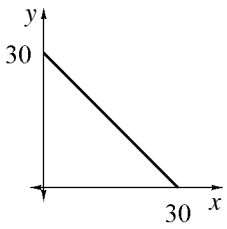
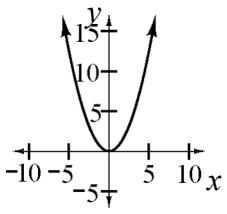


table:

x	0	1	6	20
y	30	29	24	10

1-21. **graph:**



possible inputs: all real numbers
possible outputs: any number greater than or equal to 0

1-22. **a: 1, b:** $x = 12$, **c: 13, d:** $x = \pm\sqrt{7} \approx \pm 2.65$, **e:** $x = \pm\sqrt{\frac{13}{2}} \approx \pm 2.55$, **f: no solution**

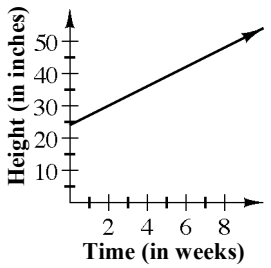
1-23. **Cube each input.**

1-24. **a: The more gas you buy, the more money you spend. I: gallons, D: dollars.**
b: People grow a lot in their early years and then their growing slows down. I: age, D: height.
c: As time goes by, the ozone concentration goes down, although the effect is slowing. I: year, D: ozone.
d: As the number of students grows, more classrooms are used and each classroom holds 30 students. I: students, D: classrooms.
e: Possible inputs: x can be any number between and including 0 and 120, possible outputs: y = 1, 2, 3, 4.

1-25. **a:** $y = 3x + 24$ **table:**

x	y
0	24
1	27
2	30
3	33
4	36
5	39

graph:



b: at 16 weeks

c: possible inputs: all numbers greater than and including 0
possible outputs: all numbers greater than and including 24

1-26. Error in line 2: It should be -14, not $+14$. $x = -37$.

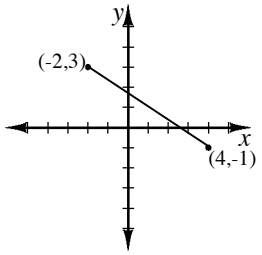
Lesson 1.1.3

1-35. **a:** the numbers between –2 and 4 inclusive

b: the numbers between –1 and 3 inclusive

c: No; he is missing all the values between those numbers. The curve is continuous, so the description needs to include all numbers, not just integers.

d: sample graph:



1-36. **a:** 70, **b:** 2, **c:** 43, **d:** undefined, **e:** $3x^2 + \sqrt{x-5} + 2$, **f:** $-3x^2 + \sqrt{x-5} + 7$,
g: all real numbers, **h:** all real numbers greater than or equal to 5,
i: They are different because the square root of a negative is undefined, whereas any real number can be squared.

1-37. Chelita is correct about *how* to find the intercepts, but she makes an error with signs while factoring. The correct equation is $(x-7)(x-3) = 0$.

1-38. **a:** $y = \frac{x-6}{3}$, **b:** $y = \frac{x+10}{5}$, **c:** $y = \pm\sqrt{x}$, **d:** $y = \pm\sqrt{\frac{x+4}{2}}$, **e:** $y = \pm\sqrt{x} + 5$

1-39. $x + (x + 18) = 84$ or $x + y = 84$ and $y = x + 18$; 33 and 51 meters long

1-40. They are similar by AA. **a:** $\frac{n}{m}$, **b:** $\frac{m}{x}$

1-41. **a:** $x = 13$, **b:** $x = 8$

Lesson 1.1.4

1-47. (2, 1)

1-48. a: 2, b: 10, c: 100, d: ~142.86

1-49. a: $x = 5, 3$; b: $x \approx 3.39, -0.89$ or $x = \frac{5 \pm \sqrt{73}}{4}$

1-50. a: $\sqrt{34} \approx 5.83$ units, b: $\frac{3}{5}$

1-51. Diagrams vary; $y = 3x$.

1-52. The error is in line 3. It should be: $0 = 5.4x + 23.7$, $x \approx -4.39$.

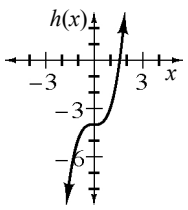
1-53. a: $x \approx -7.37$, b: $x = 2.8$

Lesson 1.2.1

1-60. table:

x	$h(x)$
–3	–31
–2	–12
–1	–5
0	–4
1	–3
2	4
3	23

graph:



domain: $-\infty < x < \infty$
range: $-\infty < x < \infty$
intercepts: (0,–4) and $(\sqrt[3]{4}, 0)$ or $(\sim 1.59, 0)$

1-61. a: ≈ 5.18 m, b: ≈ 18.66 inches, c: $\approx 24.62^\circ$, d: $\sqrt{180} \approx 13.42$

1-62. a: $\sqrt{58} \approx 7.62$ units, b: $-\frac{3}{7}$

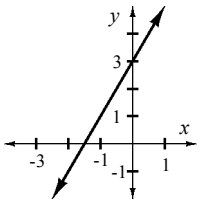
1-63. a: domain: $x = -1, 1, 2$, range: $y = -2, 1, 2$
b: domain: $-1 \le x < 1$, range: $-1 \le y < 2$
c: domain: $x \ge -1$, range: $y \ge -1$
d: domain: $-\infty < x < \infty$, range: $y \ge -2$

1-64. There is an error in line 2. Both sides need to be multiplied by x: $5 = x^2 - 4x$,
$0 = x^2 - 4x - 5 = (x - 5)(x + 1)$, $x = -1, 5$.

1-65. a: $x = 3, -2$; b: $x = 3, -3$

1-66. a: 2, b: –4, c: $\frac{1}{0}$ is undefined, d: Justifications vary.

1-67. a: (0, 3) and $(-\frac{3}{2}, 0)$, graph:



b: same as part (a)
c: These rules are equivalent, with different notation.

1-68. $x \approx 2.72$ feet, $y \approx 1.27$ feet

1-69. $l = 4w$ and $l + w = 22$ or $w + 4w = 22$. The length is 17.6 cm, and the width is 4.4 cm.

1-70. a: $x = -\frac{1}{17} \approx -0.059$, b: $x = \frac{66}{13} \approx 5.08$, c: $x = -1,\ 3$

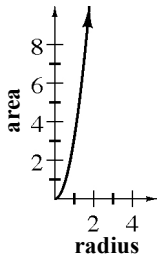
1-71. a: (–1, 9) and (5, 21), b: $x^2 + 17$, c: $x^2 - 4x - 5$

1-72. a: $x = \frac{5(y-1)}{3}$, b: $x = \frac{-2y+6}{3}$, c: $x = \pm\sqrt{y}$, d: $x = \pm\sqrt{y+100}$

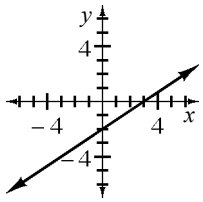
1-73. $y = \pi x^2$ table:

x	0	1	2	3	4
y	0	π	4π	9π	16π

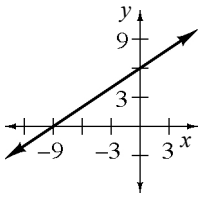
graph:



1-74. a: a line
b: $y = \frac{2}{3}x - 2$, graph:



c: Substitute $x = 0$ and solve for y, substitute $y = 0$ and solve for x, (3, 0) and (0, –2).
d: Answers vary.
e: The intercepts are $(-9, 0)$ and $(0, 6)$. Graph shown at right.



1-75. Solve $x^2 + 2x + 1 = 1$. Zero and –2 could have been dropped in.

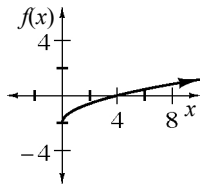
1-76. $x = 0$; a: (0, 6), b: (0, 2), c: (0, 0), d: (0, –4), e: (0, 25), f: (0, 13)

1-77. $x = \frac{12}{7}$; The second line should be $3x + 2 = 10 - 4x + 4$.

Lesson 1.2.2

1-84. **(1, 3) and (7, 81)**

1-85. **a: $x = -6$, b: $x = \frac{38}{13} \approx 2.92$**

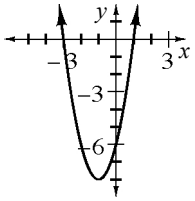
1-86. **graph:** 

intercepts: (0, –2) and (4, 0)
domain: $x \geq 0$
range: $y \geq -2$

1-87. **a: –7, b: 3.5, c: the *x*- and *y*-intercepts**

1-88. **a: $x = \frac{y-b}{m}$, b: $r = \pm\sqrt{\frac{A}{\pi}}$, c: $W = \frac{V}{LH}$, d: $y = \frac{1}{3-2x}$**

1-89. **a: (–2, 0), b: (–10, 0), c: (0, 0), d: $(\pm\sqrt{2}, 0)$, e: (5, 0), f: $(\sqrt[3]{13}, 0)$**

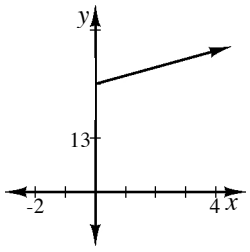
1-90. **graph:** 

domain: $-\infty < x < \infty$
range: $y \geq -8$

1-91. **a: domain: –2, –1, 2; range: –1, 0, 1; b: domain: $-1 < x \leq 1$, range: $-1 \leq y < 2$; c: domain: $x > -1$, range: $y > -1$; d: domain: $\infty < x < \infty$, range: $\infty < y < \infty$**

1-92. **a: table:**

x	*y*
0	26
1	28
2	30
3	32
4	34

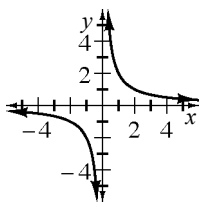
graph: 

$y = 2x + 26$

b: 37 weeks after his birthday

1-93. **table:**

x	*y*
–3	$-\frac{2}{3}$
–2	–1
–1	–2
–0.5	–4
0	undef.
0.5	4
1	2
2	1
3	$\frac{2}{3}$

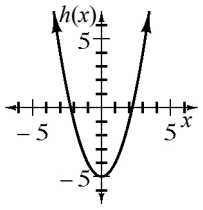
graph: 

Summary statements vary but should be justified using multiple representations

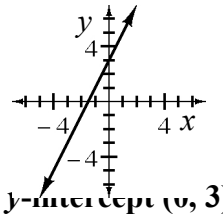
1-94. **a: Answers vary; b: When the *y*-values are the same, they must be equal; c: $3x + 15 = 3 - 3x$, $x = -2$, d: $y = 9$; e: They cross at the point (–2, 9).**

1-95. **7.5 feet**

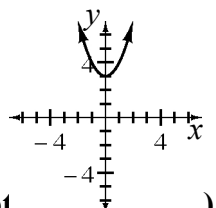
1-96. **$(\pm\sqrt{5}, 0)$; graph:**



1-97. **a:**



b:



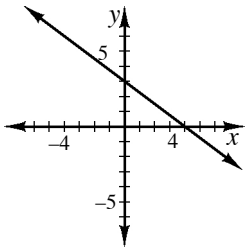
c: *y*-intercept (0, 3) for both, *x*-intercept [illegible] and none for (b)

d: (0, 3) and (2, 7), solve $2x + 3 = x^2 + 3$ to get $x = 0$ or $x = 2$

1-98. **a: 4, b: 2, c: 3, d: 1**

Lesson 1.2.3

1-105. **$m = -\frac{3}{4}$, (4, 0), (0, 3), graph:**

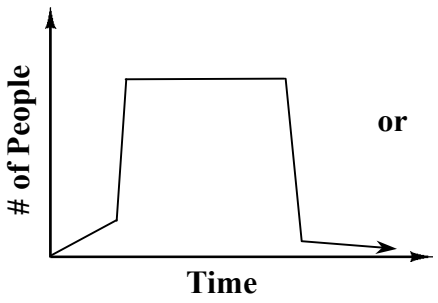


1-106. **$y = \frac{3}{2}x - 3$**

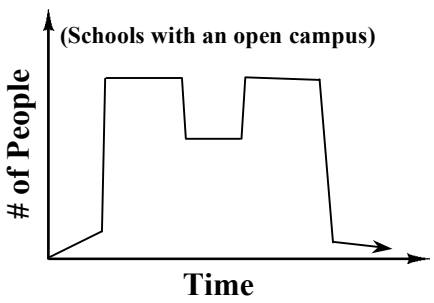
1-107. **a: $\frac{-3 \pm \sqrt{21}}{2} \approx -3.79, 0.79$; b: $\frac{7 \pm \sqrt{193}}{6} \approx 3.48, -1.15$**

1-108. **$12.00**

1-109. **sample graphs:**

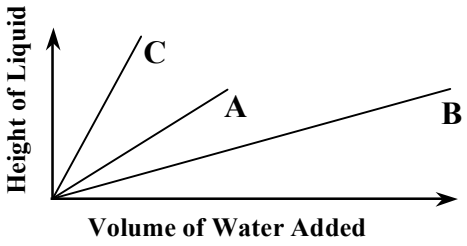


or



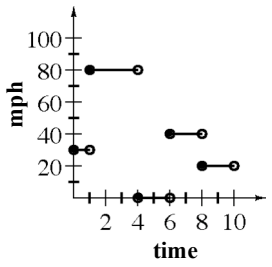
1-110. **a: domain: $-2 \le x \le 2$, range: $-3 \le y \le 2$**
b: domain: $x = 2$, range: $-\infty < y < \infty$
c: domain: $x \ge -2$, range: $-\infty < y < \infty$

1-111. **The independent variable is the volume of water; the dependent variable is the height of the liquid. The graph is 3 line segments starting at the origin. C is the steepest, and B is the least steep.**



Lesson 1.2.4

1-113. **a: a portion of the trip at a specific speed**
b: about 400 miles
c: Graph shown at right. A speed of approximately 30 mph for 1 hour, approximately 80 mph for the next 3 hours, 0 mph for 2 hours, approximately 40 mph for 2 hours, and then approximately 20 mph for the last 2 hours. Note that the step graph assumes instantaneous change of speed, which is not technically possible.



1-114. **a: 2, b: 4**

1-115. $m\measuredangle B = 39.8°$, $\sqrt{244} \approx 15.62$

1-116. **56 inches**

1-117. **a: 1, 2, 3, 4, 5 or 6; b:** $\frac{1}{6}$; **c:** $\frac{4}{6} = \frac{2}{3}$

1-118. $\frac{1}{52}$, $\frac{51}{52}$

1-119. $\frac{1}{26}$, $\frac{1}{25}$